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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
097079,759	05/15/98	GARDNER	2000.002600

MM22/0623

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EXAMINER

MAI, A

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 06/23/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
09/079,759

Applicant(s)
Gardner et al.

Examiner
Anh D. Mai

Group Art Unit
2814



☒ Responsive to communication(s) filed on May 31, 1999

☒ This action is FINAL.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-28 is/are pending in the application.

Of the above, claim(s) 1-19 is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 20-28 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 2814

DETAILED ACTION

1. The amendment filed on May 31, 1999 has been entered on Paper No. 6.
2. Claims 20 and 28 are amended.
3. Claims 20-28 (as amended) are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon (U.S. Patent No. 5,731,221) in view of Zhao et al. (U.S. Patent No. 5,843,226).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 20-28 (as amended) are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon (U.S. Patent No. 5,731,221) in view of Zhao et al. (U.S. Patent No. 5,843,226). ~~(with~~

~~respect to claims 20 and 28)~~

Kwon teaches a method for forming an isolation trench in a semiconductor substrate, the substrate having a surface, similar as claimed including:

forming a first recess in a substrate 21, the first recess has a first width W1 and extends a first depth beneath the surface of the substrate;

forming a second recess 27 in the substrate 21 within the first recess, the second recess having a second width W that is less than the first width of the first recess, the second recess

Art Unit: 2814

extends a second depth beneath the surface of the substrate, the second depth being greater than the first depth of the first recess;

forming a plurality of spacers 26' in the first recess;

forming an isolation liner 29 in at least portion of the second recess 27; and

forming an isolation material 28 in the second recess adjacent the isolation liner 29, at least a portion of the isolation liner extending between the spacers and the isolation material.

(See Fig. 2A-2G, col. 3, l. 28-col. 4, l. 40).

Kwon fails to form first trench having a first width of at most about 3000 Angstroms.

However, Zhao, in a formation of trench isolation, teaches forming trench 32 having a width of 0.25 micron (2500 Å). (See col. 5, ll. 29-33).

It would have been obvious to one having ordinary skill in the art at the time of the invention to form the first trench of Kwon having a width as taught by Zhao because the smaller width increases packing density on the chip.

With respect to claim 21, at least one material (HTO) 28 is formed in at least one of the recesses.

With respect to claim 22, as the device being process further, the material in the first recess 26 and second recess 27 eventually becomes single dielectric material.

Art Unit: 2814

With respect to claim 23, the isolation structure 28 comprises at least two different materials (TEOS and HTO).

The limitations of claims 24 are addressed.

With respect to claim 25 and 26, first and second trench are formed by etching.

With respect to claim 27, the isolation material 28 of Kwon is also deposited in the second recess 27.

Response to Arguments

5. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., forming a second recess in said substrate *within said first recess* and the first width *of at most about 3000 A*) are new limitations. As explained above, Zhao teaches the formation of isolation trenches with width less than 3000 A.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the

Art Unit: 2814

THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Technology Center 2800 fax center located in Crystal Plaza 4, room 4C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anh Mai whose telephone number is (703) 305-0575. The examiner can normally be reached on Monday-Friday from 8:30am to 6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaudhuri, Olik, can be reached on (703) 305-2794. The fax number for the organization where this application or proceeding is assigned is (703) 308-7722 or -7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center receptionist at (703) 308-0956.

A.M.

Anh D. Mai

June 18, 1999


Olik Chaudhuri
Supervisory Patent Examiner
Technology Center 2800